Hatboro Horsham School District

Project Identification: Hatboro Horsham School District
Horsham, PA
Performance Contract

Project Size: 5 Buildings – 604,644 sq ft

Project Value: $1,162,549

Source of Funds: Client arranged

Contract Terms: Fifteen Years Guaranteed Savings

Technical Design Personnel: Paul Grisafi, Senior Project Manager
Shawn Deegan, Project Manager / Construction Manager

Project Schedule:

Project Phase	Project Dates	
	Started	Completed
Comprehensive Energy Analysis	January 2006	April 2006
Design/Implementation	January 2008	December 2008
Monitoring	January 2009	January 2024

List of Improvements:

- Airflow control
- Controls / motion sensors
- Lighting retrofit
- Daylighting
- Ballasts
- Exit signs
- Lamps
- Reflectors
- Vending machines

Reference:
Robert Reichert
Director of Business Affairs
Tel 215.420.5292
Fax 215. 420.5262
Email rreicher@hatboro-horsham.org

Dennis Stinson
Operations
Tel 215.420.5492
Fax 215.420.5262
Email dstinson@hatboro-horsham.org

Hatboro Horsham School District
229 Meetinghouse Road
Horsham, PA 19044

Guaranteed Annual Energy Savings: Year 1: $110,488 (Escalated 2% annually)

Annual Non-Energy Savings: $14,350

Achieved Summarized Savings:

Initial Baselines	KWh	KW	CCF	Water (gal)	Steam (lbs)	Energy $	Non-Energy $	Total Dollars
	6,919,207	21,806	402,249	9,845,897	N/A	$1,139,377	$0	$1,139,377
Annual Savings								
Year	KWh	KW	CCF	Water (gal)	Steam (lbs)	Energy $	Non-Energy $	Total Dollars*
Construction		N/A		N/A	N/A	$7,957	N/A	$7,957
1	937,745	N/A	8,402	N/A	N/A	$120,491	$14,350	$134,841

* Energy Savings + Non-Energy Savings = Total Annual Dollars Saved

Measurement and Verification: IPMVP, 1997, Option A (Short term/periodic measurement after retrofit compared to base conditions.)

Comments: Services included: engineering analysis and design, construction management, commissioning, operator training, monitoring and verification of savings guarantee, savings guarantee, and warranty guarantees.

ATLANTIC ENERGY SOLUTIONS INC.

It Matters

32 Congress St.
Saratoga Springs, NY 12866
Phone: 518-587-3252
Fax: 518-587-4328
Email: aesgeneral@atlanticenergy.net

ENERGY PERFORMANCE PROJECT

CASE STUDY

MECHANICVILLE CITY SCHOOL DISTRICT

EDUCATING TODAY'S YOUTH TO BE TOMORROW'S LEADERS

ABOUT MECHANICVILLE CITY SCHOOL DISTRICT

The Mechanicville School District has changed from a highly industrial and railroad center to a community which has light industry and is a bedroom community to the Capital District. The school district includes the City of Mechanicville, parts of the Town of Stillwater, Schaghticoke and Halfmoon. The proximity of the district to the capital district, Saratoga and the Adirondack area makes it a convenient location to live and commute to major area employers, such as the State of New York and General Electric.

Mechanicville City School District offers a variety of large school experiences in a small school setting. These experiences, when combined with the strong support of the community, make Mechanicville Schools' family setting conducive for success.

The project broke ground in the spring of 2006 when we began upgrading the facility. Many efficiency measures were included in this project.

The existing boiler systems on the campus was upgraded with a new modulating boiler. The campus was also fitted with 3 Combined Heat and Power (CHP) units. These units run grid parallel to produce about 80% of the electricity at each building.

Included in the project was a full lighting upgrade and retrofit. The building envelope was addressed with a full weatherization package. New double pane high efficient U factor windows were installed, and a digital control system was installed to automate all of the mechanical equipment installed.

PROJECT SUMMARY

PROJECT SIZE: $1,272,438

ANNUAL SAVINGS: $70,691

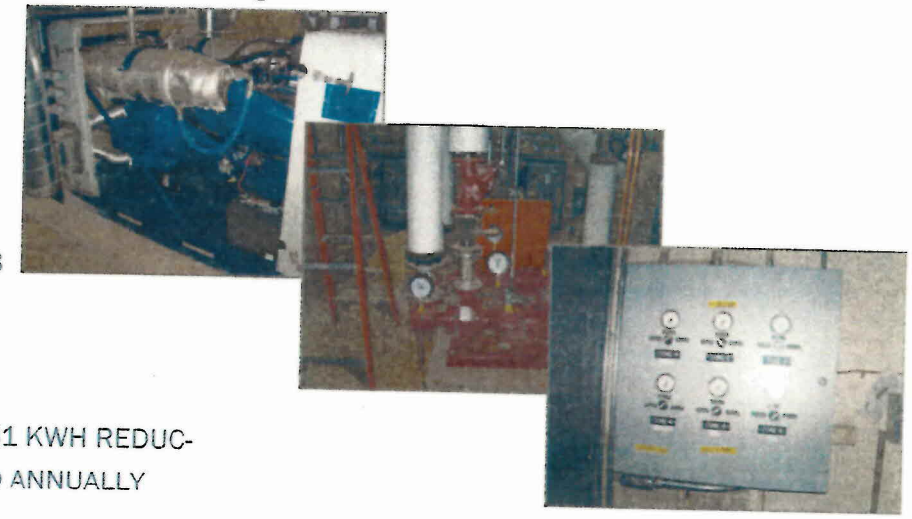
NYSERDA REBATE: $55,210

NET COST TO CLIENT: $1,217,228

SQUARE FOOTAGE: 187,790

SIMPLE PAYBACK: 18 YEARS

ENVIRONMENTAL IMPACT: 546,081 KWH REDUCTION = TO 77 CARS OFF THE ROAD ANNUALLY



Oxford Area Community Schools

Oxford, Michigan
Energy Performance Contract

Project Size: 7 buildings, 854,330 sq ft

Project Dollar Amount: $2,926,477

Source of Funds: Bond

Contract Terms: 15 years

Project Schedule: Completed on schedule

Project Phase	Project Dates	
	Started	Completed
Comprehensive Energy Analysis	December 2006	December 2006
Design/Implementation	July 2007	April 2008
Monitoring	April 2008	N/A

Guaranteed Annual Energy Savings: $261,670

Annual Non-Energy Savings: $15,000

List of Improvements:

- Modified natatorium summer reheat source at high school
- Replaced existing absorption chiller at middle school
- Retrofit / repaired AHUs at high school
- Re-commissioned / rebalanced existing AHUs at high school
- Retrofit Server Room AHU
- Replaced existing boilers – Clear Lake, Lakeville Elementary Schools and the Middle School
- Boiler system modification – Oxford Elementary
- Boiler system improvements – Leonard Elementary
- Replaced existing supply fan / return fan Vortex Dampers with VFDs – Middle School

(see other side for more)

Achieved Summarized Savings:

Baselines	kWh	kW	CCF	Water (gal)	Energy $	Non-Energy $	Procurement & Energy Awareness $	Total Dollars
	1,368,356		186,366	2,195	$261,670	$15,000	$57,144	$333,814
ANNUAL SAVINGS								
Year	kWh	kW	CCF	Water (gal)	Energy $	Non-Energy $	Procurement & Energy Awareness $	Total Dollars*
Construction								
1								

* Energy Savings + Non-Energy Savings = Total Annual Dollars Saved

Measurement and Verification: IPMVP, 1997, Option A (short-term/periodic measurements after retrofit compared to base conditions); IPMVP, 1997, Option D (computer simulation of post-install consumption used to measure savings); Stipulated.

Comments: Project included complete re-commissioning of all district school buildings, including newly constructed high school facility.

For more information, contact: Steve Spurgeon, 800 475 3500 +7488663
www.chevronenergy.com

Reference:

Mr. Timothy C. Loock, Asst. Superintendent
for Business & Operations
Oxford Area Community Schools
105 Pontiac Street
Oxford, MI 48371
Tel 248 969 5000
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loockt01@oxford.k12.mi.us

Oxford Area Community Schools, continued

List of Improvements, cont'd:

- Lighting upgrades in all buildings
- Expanded / upgraded existing DDC system in all buildings
- Re-commissioned existing DDC system in all buildings
- Building envelope improvements – Oxford, Clear Lake and Leonard Elementary Schools
- Added air conditioning to classrooms – Leonard Elementary
- Water conservation
- Repaired / replaced existing classroom unit vents
- Installed instantaneous DWH – kitchen sink & concession sinks at Middle School
- Installed instantaneous DWH – kitchen sink & toilet sink at Oxford, Daniel Axford, Clear Lake, Leonard, and Lakeville Elementary Schools
- No cost / low cost PM measures
- Waste removal modifications
- Replaced DWH system – Daniel Axford Elementary
- Replaced domestic water piping – Oxford Elementary
- Installed natural gas and electric sub meters – Lakeville Elementary
- Eliminated two existing greenhouses – Oxford Elementary
- Power factor correction at the High School, Middle School, and Lakeville Elementary
- Energy star computer programming
- Vending machine energy controllers
- Utility procurement management / consulting
- Energy awareness training

East Lycoming School District, Hughesville, PA

Partnering To Insure Energy Performance

The East Lycoming School District (ELSD) Board and Administrators faced a problem that has become typical across Pennsylvania – how to upgrade the failing heating, ventilation, and electrical infrastructure of aging facilities without undertaking a complete building renovation.

As a solution, the PPL Energy Services/ McClure Company team provided an Energy Reduction and Facility Upgrade Program. Initially, the team spent over 800 hours analyzing the district energy use and costs, surveying the four buildings and their systems, developing Energy Conservation Measures (ECMs), and putting together a comprehensive program that would optimize dollars spent and target facility improvements.

As a result of the development work, the PPL/McClure Energy Program for ELSD included the following:

- Upgrades for lighting systems including both replacement bulbs/ballasts and complete fixture replacements reducing energy while simultaneously improving light levels.
- Conversion of failing pneumatic automatic temperature control systems in the High School and Ashkar ES to modern digital controls technology.
- Complete replacement of aging and inefficient heating and ventilating systems in the High School and Ashkar ES.
- Replacement of a new domestic hot water heater at Ashkar ES.
- Replacement of (2) unreliable High School emergency generators with one, centrally located unit.
- Replacement of aging and inefficient food service equipment at the High School and one of the Elementary Schools.

This comprehensive program included the complete HVAC system replacement for two schools along with the complete lighting upgrade for four schools with no interruption of the district educational schedule. After the systems were installed and commissioned, ELSD personnel were trained on the operation of the equipment and the computerized environmental control system.

The district's goal was to see air conditioning added to the Hughesville High School for the improved comfort, health and performance of the students.

"The East Lycoming School District is fortunate to have partnered with a firm that has committed themselves to stand behind their work including the continued follow-up to guarantee and insure the energy performance of our buildings."

Dave Maciejewski, Business Manager

How does PPL Energy Services/McClure Company achieve superior results? We can leverage our multiple talents for your benefit. We remain the only integrated team of engineers, certified energy managers, construction managers, service technicians, and construction trades people in the central Pennsylvania region. All of these skills are located under a single roof at our Harrisburg facility

4101 North Sixth Street, Harrisburg, PA 17110
717-232-9743 • www.mcclureco.com

To: Ben Fox

From: DWF

RE: Daylighting and Learning

Heschong Mahone Stuidy 1999:

Daylighting in Schools - PG&E 1999

An Investigation into the Relationship between Daylighting and Human Performance

This study looks at the effect of daylighting on human performance. It includes a focus on skylighting as a way to isolate daylight as an illumination source, and separate illumination effects from other qualities associated with daylighting from windows. In this project, we established a statistically compelling connection between daylighting and student performance, and between skylighting and retail sales. This report focuses on the school analysis.

We obtained student performance data from three elementary school districts and looked for a correlation to the amount of daylight provided by each student's classroom environment. We used data from second through fifth grade students in elementary schools because there is extensive data available from highly standardized tests administered to these students, and because elementary school students are generally assigned to one teacher in one classroom for the school year. Thus, we reasoned that if the physical environment does indeed have an effect on student performance, we would be mostly likely to be able to establish such a correlation by looking at the performance of elementary school students.

We analyzed test score results for over 21,000 student records from the three districts, located in Orange Country, California, Seattle , Washington, and Fort Collins, Colorado. The data sets included information about student demographic characteristics and participation in special school programs. We reviewed architectural plans, aerial photographs and maintenance records and visited a sample of the schools in each district to classify the daylighting conditions in over 2000 classrooms. Each classroom was assigned a series of codes on a simple 0-5 scale indicating the size and tint of its windows, the presence and type of any skylighting, and the overall amount of daylight expected.

The study used multivariate linear regression analysis to control for other influences on student performance. Regressions were compared using data from two separate tests, math and reading, for each district. Each math and reading model was also run separately using first the window and skylight codes, and then the overall daylight code. We reasoned that if daylight effects were truly robust the variables should perform similarly in all models. Thus, we created a total of twelve models for comparison, consisting of four models for each of three districts.

The daylighting conditions at the **Capistrano school district** were the most diverse, and the data from that district were also the most detailed. Thus Capistrano became our most precise model. In this district, we were able to study the change in student test scores over a school year. Controlling for all other influences, we found that students with the most daylighting in their classrooms progressed 20% faster on math tests and 26% on reading tests in one year than those with the least. Similarly, students with the largest window areas were found to progress15% faster in math and 23% faster in reading than those with the least. And students that had a well-designed skylight in their room, one that diffused the daylight throughout the room and which allowed teachers to control the amount of daylight entering the room, also

improved by 19-20% faster than those students without a skylight. We also identified another window-related effect, in that students in classrooms where windows could be opened were found to progress 7-8% faster than those with fixed windows, regardless of whether they also had air conditioning. These effects were all observed with 99% statistical certainty.

The studies in **Seattle and Fort Collins** used the final scores on math and reading tests at the end of the school year, rather than the amount of change from the beginning of the year. In both of these districts we also found positive, and highly significant, effects for daylighting. Students in classrooms with the most daylighting were found to have 7% to 18% higher scores than those with the least.

The three districts have different curriculum and teaching styles, different school building designs and very different climates. And yet the results of studies show consistently positive and highly significant effects. This consistency persuasively argues that there is a valid and predictable effect of daylighting on student performance.

The results of this study of student performance, when combined with the companion study showing the positive effect of skylighting on retail sales, also strongly support the thesis that these performance benefits from daylighting can be translated to other building types and human activities.

Follow-up study to review measurement procedures:

Re-Analysis Report: Daylighting in Schools, Additional Analysis - CEC PIER 2001

This report is a follow-on study to the Daylighting in Schools study[5] that was completed in 1999, which found a compelling statistical correlation between the amount of daylighting in elementary school classrooms and the performance of students on standardized math and reading tests. This re-analysis of the original study data was intended to answer key questions raised by the peer review of the earlier study, and expand our understanding of methodological choices for further work.

The original findings potentially have very important implications for the design of schools and other buildings where people live, work and play. Daylight used to be common, and even required in schools, homes and offices, but fully daylit buildings became increasingly rare as electric lighting became more the norm. This re-analysis study helps to provide greater certainty for the original findings.

For this re-analysis study HMG conducted four tasks:

- The Teacher Survey collected information from a sample of teachers in the Capistrano school district about their education and experience levels, preferences for classroom features and operation of those features. The primary purpose of the survey was to provide input to a subsequent "assignment bias" analysis. In addition, we learned some useful information about teacher preferences, attitudes and behaviors in response to classrooms conditions.

- While the teachers we surveyed generally had a preference for windows, daylight and views in their classrooms, these preferences were not found to be driving classroom preferences. Far more important was an almost universal desire for more space, a good location, quiet, lots of storage and water in the classroom.
- Environmental control was also found to be an important issue for teachers, especially for those who did not have full control. Teachers seemed to hold a basic expectation that they would be able to control light levels, sun penetration, acoustic conditions, temperature and ventilation in their classrooms. They made passionate comments about the need for improvement if one or more of these environmental conditions could not be controlled in their classroom.
- The Teacher Bias Analysis further examined information from the Teacher Survey. The survey data was coded into variables and statistically analyzed in relation to both assignment to daylit classrooms and the student performance models. The goal of the Bias Analysis was to discover if the original study had over-inflated the effect of daylight on student learning by not accounting for a potential "assignment bias" of better teachers to more daylit classrooms.

We conclusively found that there was not an "assignment bias" influencing our results. None of the individual teacher characteristics we identified were significant in explaining assignment to a daylit classroom in the Capistrano District. Considering all teacher characteristics together only explained 1% of the variation in assignment to daylit classrooms. We did find that a few types of teachers, those with more experience or honors, were slightly more likely (1%-5%) to be assigned to classrooms with more windows or some types of skylights.

When we added the teacher characteristics to the original student performance models, the daylight variables were not reduced in significance. Further analysis of other sub-populations repeated these findings. Among twelve models considered, we identified a central tendency of a 21% improvement in student learning rates from those in classrooms with the least amount of daylight compared to those with the most.

In the Grade Level Analysis, we re-analyzed the original student test score data for both Capistrano and Seattle by separate grade level, instead of aggregating the data across the four grade levels (2-5). Our goal was to determine if this method would more accurately explain the relationship of student performance to daylighting. We tested for statistical significance and correlation, and we looked at any patterns discovered in the analysis.

The data did not show any significant patterns between a daylight effect and the separate grade levels, neither an increase or decrease in daylight effects by grade level. Thus, we conclude that there do not seem to be progressive effects as children get older, nor do younger children seem to be more sensitive to daylight than older children. Allowing the results to vary by grade did not noticeably improve the accuracy of the models. Therefore, we conclude that looking at data across grade levels is a sufficiently accurate methodology.

In the Absenteeism Analysis, we used absenteeism and tardiness data in the original Capistrano data set as dependent variables and evaluated them against the full set of explanatory variables from the original study, plus the new information on teacher characteristics. These models would allow us to assess whether daylighting or other classroom physical attributes potentially impacted student health, as measured by changes in student attendance.

Student attendance data is certainly not the best indicator of student health. Yet to the extent that attendance data does reflect student health, our findings do not suggest an obvious connection between physical classroom characteristics and student health. Notably, daylighting

conditions, operable windows, air conditioning and portable classrooms were not found to be significant in predicting student absences.

Overall, the strength of the daylight variable in predicting student performance stands out sharply across all of these re-analysis efforts.

This analysis also demonstrated that the findings of these models are more strongly dependent upon the sample population then the subtleties of the explanatory variables. Thus, we believe that it will be more informative to replicate this study with a different population, to continue to try to refine the models with further detail in the explanatory variables.

The Effect of Daylighting on Student Performance

	Capistrano learning rate	Seattle higher scores	Ft Collins higher scores
Windows	15% - 23%	13% - 15%	14% - 18%
Skylights	19% - 20% A	6% - 8%	0% - 3%
Daylight	20% - 26%	9% - 13%	7%
Operable Windows	7% - 8%	-	-

A 1999 study by the Heschong Mahone Group on 21,000 student records from 2000 classrooms in California, Washington, and Colorado found that students with the most daylighting in their classrooms progressed 20% faster on math tests and 26% faster on reading tests in one year than those with the least.

From: Keys to Good Daylighting, Innovative Design, Inc©

draft workplan to NYC

Attorney Work Product- Confidential

Draft: 2/03/11

Work Plan to Address PCB Contaminated Lighting Fixtures in New York City Schools (NYC PCB Lighting Work Plan)

This NYC PCB Lighting Work Plan ("Work Plan" or "Plan") is attached to and part of the Agreement between EPA and the City of New York (the "City").

This Work Plan contains actions to prioritize and respond to the presence of PCBs within older lighting fixtures in NYC public schools. PCBs presumptively are present within ballasts in lighting fixtures in 772 public schools in the City. Over time, these ballasts may become defective and PCBs may leak from the ballasts onto the lighting fixtures and into the environment at the schools.

I Identification of Schools

A. Within _____ days after the effective date of the agreement, Respondent shall submit to EPA an updated list of public school buildings that have fluorescent or other lighting fixtures, which may contain PCBs within ballasts. The list shall include the number and type of PCB containing lighting fixtures in each school. During the implementation of this Work Plan, the City may amend the list as additional information becomes available.

II Stage 1: Lighting Fixtures Inspection and Remediation Program

Stage 1 sets forth an immediate inspection and remediation program for PCB containing lighting fixtures in the City's schools. The program consists of several related parts, which are described below. Within _____ days of the effective date of the agreement a detailed protocol will be developed by the City to carry out the program, which will be submitted to EPA for approval. At a minimum the protocol will include: the methods to provide for the complete removal of potentially contaminated materials from light fixtures that were identified as having leaks/past leaks during the visual survey, sampling of fixtures that were found to have oil/tar stains or deposits, immediate removal any ballasts that are currently leaking, a plan for proper TSCA disposal of waste, and a plan to monitor any potential PCB containing ballasts that are not currently leaking until such time as they may be removed.

The program is directed at all the schools identified pursuant to I., above. The inspection and remediation program will continue to apply to each school until the school is under contract (see Stages 2 & 3, below) to implement total lighting fixture replacement.

A. **Required Visual Inspection of Lighting Fixtures:** On January 11, 2011, the City's Division of School Facilities (the "Division") directed that all Custodian Engineers

and Building Managers visually inspect T-12 lighting fixtures in their schools, and report any evidence of possible staining on fixtures or on the floors below. The City will expand the mandate under this directive to include any other lighting fixtures that may contain PCBs within ballasts. The City will consult with EPA concerning additional directives the Division may plan to send to school personnel concerning this problem.

B. **Response To Inspection Reports of Possible Leaking PCBs:** The City shall establish a system for expedited response to reports of possible leaking PCBs that are filed pursuant to the inspection program described above, and also reports that may be filed by third parties such as teachers, parents or others. The response system shall include the use of full-time, trained response teams (full time staff or contractors) and equipment necessary to provide follow-up of any reports of leaks within ____ hours of receipt. The response teams will perform the following tasks: 1) inspect the fixture or fixtures to verify leaking or ruptured ballasts; 2) clean and clear in accordance with TSCA regulatory requirements room areas contaminated by the leak; 3) clean and clear fixtures in accordance with TSCA regulatory requirements and install new ballasts or remove and replace the fixture(s); and 4) dispose of the defective ballasts, contaminated fixtures and wastes generated during cleaning in accordance with TSCA regulatory requirements.

C. **Backlog of Reports of Possible Leaking PCBs:** The City will establish and carry out a program to respond to any backlog of reports of possible leaking PCB lighting fixtures, including a timetable for completion of response actions. The backlog of such reports will be addressed in the manner specified in B., above.

D. **Additional Inspections Protocol:** The City shall establish a minimum of _____ response teams (full time staff or contractors) with adequate, trained personnel and equipment to provide the follow-up on reports of leaking ballasts as described in B and C, above. In addition, the response teams, when not engaged in responding to reports of possible leaking PCBs pursuant to B. and C., above, will be assigned by the Division to visit schools containing fluorescent or other lighting fixtures that may contain PCBs to perform survey inspections of ballasts/lighting fixtures, and, where necessary, perform remedial work as described in B., above. NYC and EPA shall jointly establish a protocol for the inspections.

E. **Real Time Reporting:** The City shall establish a system to report electronically to EPA on the work performed pursuant to A.-D., above. The system shall show the number of reports of potential defective lighting fixtures, response actions, including

types of actions, and data recorded, and the work performed by the Inspection and Remediation program. That report shall provide at a minimum the following information: school identification, date of school construction, date of lighting replacement (or partial replacement as appropriate), if the ballast is old/new (no PCB), whether ballast is thermally protected, wattage, manufacturer, date and catalog codes on ballast, if the ballast was currently leaking, and if there is evidence of past leaks on the tray or body of fixtures. The reporting shall also include additional data as may be detailed in the protocol to be established for Stage 1 tasks

III Stage 2: Performance Contracting Plan for Older Lighting Fixture Replacements and Energy Efficient Retrofitting.

Acting through the Department of Citywide Administrative Services, Division of Energy Management (the "Energy Division"), the City has developed and will implement a Performance Contracting Plan, utilizing ESCOs or other funding mechanisms the City finds appropriate, to carry out energy audits and retrofitting for the schools that are the subject of this Work Plan. Based on the results of energy audits, an energy retrofitting plan will be developed for these schools. The energy retrofitting plan for each school will include replacing all lighting fixtures in the schools with energy efficient non-PCB containing lighting fixtures under a newly designed lighting system ("relamping"). Stage 2 of this Work Plan contains a program and timetable to perform the relamping component of the energy retrofitting on an initial _____ schools.

A. First _____ Performance Services Contracts of ___ Schools Each to Include Relamping of ___ Schools by_____.

By April 2011, the Energy Division will release Requests for Proposals ("RFPs") for energy retrofitting for _____ performance contracts, each to address _____ schools. The schools to be included in these contracts will be selected by a priority system to be established through discussions between the City and EPA, taking into account factors that will include the ages of the lighting fixtures in the schools, the ages of school children served in the schools, geographic dispersal and requirements for energy retrofitting components other than lighting. The RFPs' provisions will include performance guarantees to ensure budgetary savings. The contracts may contain stages - - the later stage(s) to be released to the contractor as work progresses on the schools under the first stage. While the performance contracts may contain work on the buildings heating and ventilation systems and other energy consuming components, a main work priority under the contracts will be the total relamping of the schools. The performance guarantees will be calculated over the entire number of schools in the contracts. The ___ performance contracts will specify that the relamping of each of the _____ schools included in each contract will be completed by _____.

B. Additional Performance Services Contracts for Relamping of ___ Schools By _____.

The City will release _____ additional RFPs for performance services retrofitting contracts by _____ for a total of _____ additional schools. These contracts will contain provisions similar to those described in III A., above. The relamping of these schools will be completed by _____.

IV. Stage 3: Additional Performance Services Contracting for Older Lighting Fixture Replacements and Energy Retrofitting of _____ remaining Schools by _____.

The City shall continue to issue RFPs for additional performance services retrofitting contracts for schools so that all the remaining schools (approximately ___) shall be relamped by _____. The contracts shall contain provisions similar to those described in III A. and III B., above.

V. Citizen Participation Plan

Within sixty (60) days of the effective date of this agreement, New York City shall submit a Citizens Participation Plan to EPA for approval outlining steps to inform and obtain input from the public concerning this Work Plan. The Citizens Participation Plan shall include a document depository, public information sessions, fact sheets, a plan for access to a City Department of Education website to contain relevant data and information on this Work Plan, and an implementation timetable.

VI. Scheduling Changes

The Project Coordinators of EPA and the City may agree to changes in the scheduling of events under this Work Plan. Any such changes shall be approved in writing by EPA's Director, Division of Enforcement and Compliance Assistance. Any requests for changes in the scheduling of events by the City shall include a written justification for the request.

pepco Energy Services

1300 N. 17th St., Suite 1600
Arlington, VA 22209
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NEWS RELEASE

FOR IMMEDIATE RELEASE
October 10, 2006

Contact: Kim Price
703.253.1839

PEPCO ENERGY SERVICES AWARDED $55 MILLION ENERGY SAVINGS PERFORMANCE CONTRACT WITH BALTIMORE CITY PUBLIC SCHOOLS

15 Year Contract Will Provide Over $27 Million in Guaranteed Energy Cost Savings

ARLINGTON, VA – Pepco Energy Services, a subsidiary of Pepco Holdings, Inc. (NYSE: POM) and a leader in energy savings performance contracting, has been chosen to provide a comprehensive energy efficiency and guaranteed savings program for the Baltimore City Public School System (BCPSS). Pepco Energy Services has served as the electricity supplier to the Baltimore City Public School System since June, 2006.

The 15-year contract calls for Pepco Energy Services to provide high-efficiency lighting and water conservation measures, the replacement of heating and cooling systems, the expansion of the energy management control system and the installation of new windows. Construction is underway and is expected to be completed by November, 2007.

To assure that the energy savings are achieved, Pepco Energy Services will provide on-going maintenance for all the equipment being installed for the entire term of the contract.

According to Hatim Jabaji, who heads Baltimore City's Energy Conservation Office, "The Department of Public Works and the Energy Office have worked closely with the BCPSS in developing and on-going management of this public-private partnership."

"Pepco Energy Services is excited to be providing the Baltimore City Public School System with substantial energy savings while also helping the environment," said John Huffman, President and Chief Operating Officer of Pepco Energy Services.

"The energy savings created by these improvements will allow the Baltimore City Public School System to fund much needed upgrades in 32 schools," stated David Weiss, President of the Performance Management Group of Pepco Energy Services.

- more -

Since 1995, Pepco Energy Services has developed, implemented and financed over $500 million of energy savings performance contracts for more than 200 customers, including the single largest energy savings performance contract ever awarded by the Federal Government—a project for the Military District of Washington which includes Fort Meade, Maryland that will produce over $200 million of guaranteed energy savings.

Accredited by the National Association of Energy Service Companies (NAESCO), Pepco Energy Services has also completed energy savings performance contracts for many federal and state government agencies. Most recently, it has completed projects at the Thomas B. Finan Hospital Center in Cumberland, Maryland for the Maryland Department of Health and Mental Hygiene and at K-12 school districts in Maryland, Pennsylvania, Virginia, and West Virginia.

About Pepco Energy Services

Pepco Energy Services, Inc., a wholly owned subsidiary of Pepco Holdings, Inc. (NYSE: POM), provides commercial, institutional, government and industrial customers with competitive electricity and natural gas supply, and energy efficiency services. Pepco Energy Services generates more than $1 billion of revenue annually. Visit www.pepcoenergy.com for more information.

Pepco Energy Services, Inc. is not the same company as Potomac Electric Power Company, and prices and services of Pepco Energy Services, Inc. are not set by the Public Service Commission.

Information contained in this news release may include forward-looking statements which should be considered in light of the risks inherent in the business of Pepco Holdings, Inc. and its subsidiaries, as discussed in public documents filed with the Securities and Exchange Commission.

###

CASE STUDY

CONTROL TECHNOLOGY AND SOLUTIONS

Scotland Co. R-I

Rte 3 Box 19A
Memphis, Missouri 63555
(660) 465-8531

Energy Star Award: Scotland's High School and Elementary School have both been awarded the EPA's Energy Star Award for rating in the nation's top 25% for superior energy efficiency and environmental protection.

Project Results

"The project has been very successful. We had been faced with severe comfort issues for several years. We now see a huge improvement in both our comfort and lighting levels, and our utility costs are lower. The students, faculty and community are all pleased with the project. CTS's on site project management was a big asset and allowed the project to progress smoothly. We would definitely recommend CTS to other districts."

Dave Shalley, Superintendent

Existing Conditions:

The Scotland County R-I School District was operating with very uncomfortable environments. The building was experiencing many hot and cold areas and the existing mechanical equipment, which was well past its life expectancy, was not able to create the comfort needed for a healthy and productive learning environment. Additionally, the original heating only multi-zone system had been altered 10 years ago by adding air conditioning to the roof top units. This alteration had not been adequately sized to provide proper conditioning of the space. Also, the outdated and inefficient lighting systems were not providing recommended lighting levels for productive learning.

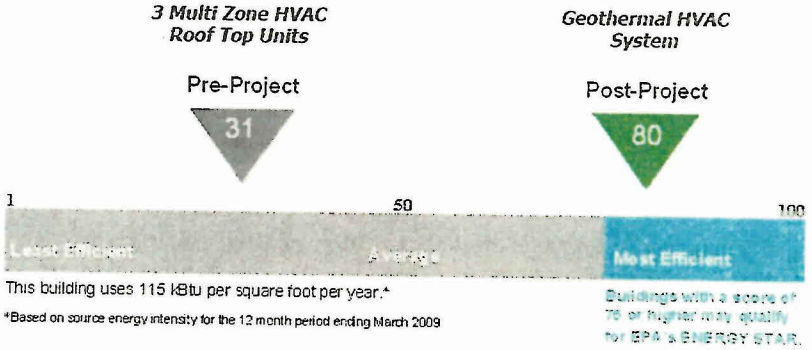
Project Overview:

CTS reviewed the existing conditions and various systems that could possibly be used to alleviate the problems the District was facing. After careful analysis and review of life-cycle costs, it was determined that a ground source geothermal system would provide the best solution to the comfort issues. The scope of the project included:

- Geothermal ground source heat pump system consisting of 100 wells at a depth of 200 feet. The classroom/hallway heat pump units were installed above the ceilings wherever possible.
- A building automation temperature control system was installed. Individual classroom controls are networked to a campus wide system. The District now has the ability to schedule, trouble shoot, monitor and adjust the heat pump systems remotely through any PC equipped with the Windows operating system and Internet Explorer software.
- New energy efficient hot water heaters were installed along with a new kitchen make up air unit to provide compensation for exhausted air.
- The electrical system was upgraded to accommodate the retrofits.
- The lighting systems were retrofitted with T-8 lamps and electronic ballasts providing proper lighting and reducing energy costs.

The new improvements cut utility expenditures over 35% saving the District $46,800 in first year energy costs and over $135,000 in annual operating costs.

The District's Energy Star Rating Jumped from 31 to 80 following the improvement project with CTS



NEW LEED PROGRAM FOR K-12 SCHOOLS

Lindsay Baker, USGBC staff

In December 2006, USGBC is launching LEED for Schools, a market-specific application of LEED that recognizes the unique nature and educational aspects of the design and construction of K-12 schools. The rating system is based on LEED for New Construction, and addresses issues such as classroom acoustics, master planning, mold prevention, and joint use of facilities. The program launch (no pilot period will take place) is supported by a full set of tools tailored to schools: a reference guide, workshop, and LEED Online with credit templates. In doing so, USGBC hopes to help school districts across the country better understand the business case for building green and to help them to implement their green building goals through a third-party certification program that is supported by educational offerings and a nationwide network of LEED Accredited Professionals, USGBC chapters and members. School districts can implement LEED without the additional cost of establishing in-house certification programs.

For more information on the LEED for Schools program, go to www.usgbc.org/leed.

Greening America's Schools Guide
Oct 2006
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  - USGBC

Health and Learning Benefits of Green Schools

According to the US General Accounting Office, 14 million students (over a quarter of all students) attend schools considered below standard or dangerous and almost two-thirds of schools have building features such as air conditioning that are in need of extensive repair or replacement. This statistic does not include schools with less obvious but important health related problems such as inadequate ventilation. A recently published document by the American Federation of Teachers notes that the General Accounting Office found that the air is unfit to breathe in nearly 15 thousand schools.[28]

Poor health and study conditions in schools are of particular concern for a number of reasons, including:

- There are some 60 million students, faculty and staff in schools.
- The large majority of schools are built not to optimize health and comfort, but rather to achieve a minimum required level of design performance at lowest cost.
- Few states regulate indoor air quality in schools or provide for minimum ventilation standards.
- Almost no schools are designed with the specific objective of creating healthy and productive study and learning environments.
- Chronic shortage of funds in schools means that schools typically suffer from inadequate maintenance, and experience degradation of basic systems such as ventilation, air quality and lighting quality, as well as poor control over pollutants (e.g., from cleaning materials).
- Students and faculty typically spend 85% to 90% of their time indoors (mostly at home and at school), and the concentration of pollutants indoors is typically higher than outdoors, sometimes by as much as 10 or even 100 times.[29]
- Children are growing, their organs are developing, and they breathe more air relative to their body size than adults, and as a result sustain greater health problems and risks than adults from toxics and pollutants common in schools.[30]

There is a large body of research linking health and productivity with specific building design attributes.

The costs of poor indoor environmental and air quality in schools, including higher absenteeism and increased respiratory ailments, have generally been "hidden" in sick days, lower teacher and staff productivity, lower student motivation, slower learning, lower tests scores, increased medical costs, and lowered lifelong achievement and earnings.

There is a large body of research linking health and productivity with specific building design operation attributes (e.g., indoor air quality and control over work environment, including lighting levels, air flow, humidity, and temperature).

However, many reviews of the effects of classroom healthiness on students look only at school-specific studies. This unnecessarily limits the relevant data available to understand and quantify benefits of high performance, healthy design in schools. The tasks done by "knowledge workers" (including most non-factory white collar workers) – such as reading comprehension, synthesis of information, writing, calculations, and communications – are very similar to the work students do. Large-scale studies correlating green or high performance features with increased productivity and performance in many non-academic institutions are therefore relevant to schools.

Two studies of over 11,000 workers in 107 European buildings analyzed the health effect of worker-controlled temperature and ventilation. These studies found significantly reduced illness symptoms, reduced absenteeism and increased productivity relative to workers in a group whose workspace lacked these features.[31]

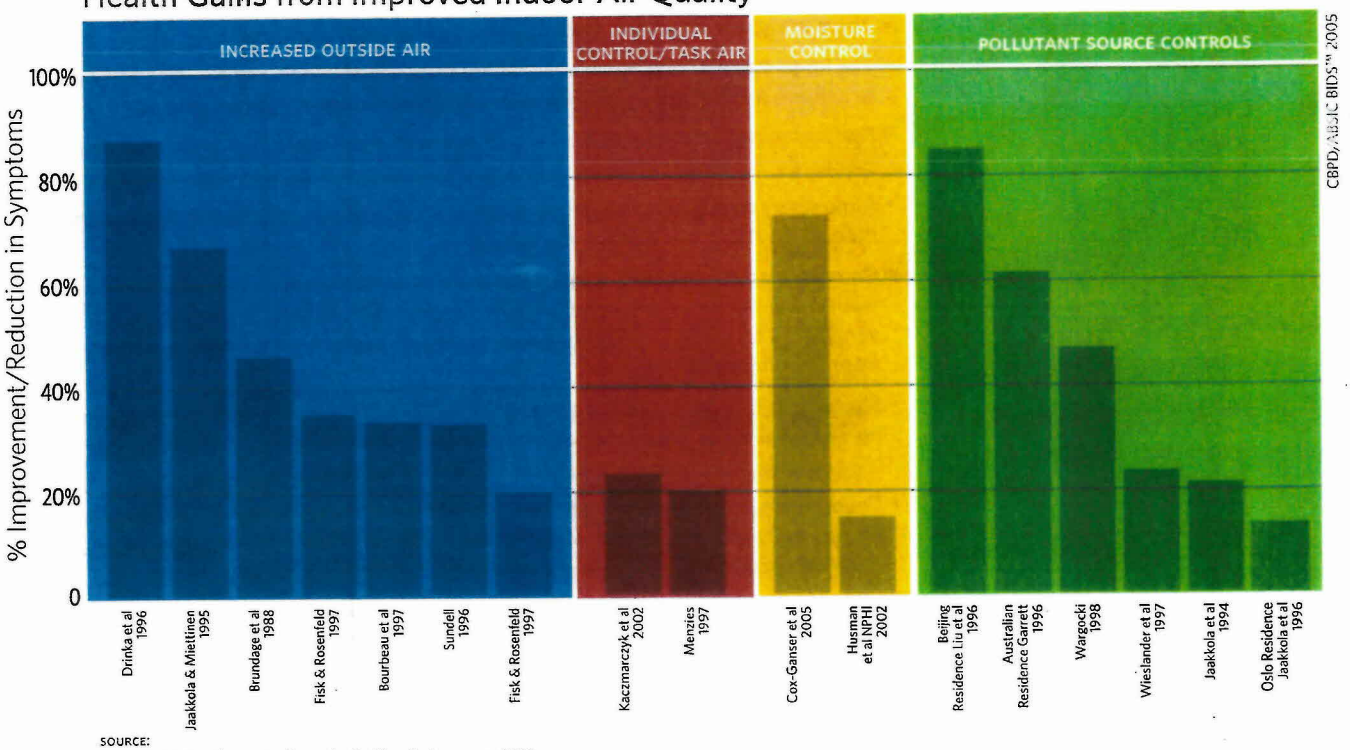
One of the leading national centers of expertise on the topic is the Center for Building Performance at Carnegie Mellon University. The Center's Building Investment Decision Support (BIDS) program has reviewed over 1,500 studies that relate technical characteristics of buildings, such as lighting, ventilation and thermal control, to tenant responses, such as productivity or health.[32]

Collectively, these studies demonstrate that better building design correlates with increases in tenant/worker well-being and productivity. The BIDS data set includes a number of controlled laboratory studies where speed and accuracy at specific tasks, such as typing, addition, proof reading, paragraph completion, reading comprehension, and creative thinking, were found to improve in high performance building ventilation, thermal control, and lighting control environments.[33]

17 separate studies all found positive health impacts from improved indoor air-quality, ranging from 13.5% up to 87% improvement.

FIGURE 5

Health Gains from Improved Indoor Air Quality



SOURCE:
Carnegie Mellon University Center for Building Performance, 2005

Good lighting "improves test scores, reduces off-task behavior, and plays a significant role in the achievement of students."

INDOOR AIR QUALITY

The Carnegie Mellon building performance program identified 17 substantial studies that document the relationship between improved air quality and health. The health impacts include asthma, flu, sick building syndrome, respiratory problems, and headaches. These 17 separate studies all found positive health impacts (i.e. reduction in reported prevalence of symptoms) ranging from 13.5% up to 87% improvement, with average improvement of 41% *(Figure B)*.

TEMPERATURE CONTROL

Teachers believe that temperature comfort affects both teaching quality and student achievement.[34] Research indicates that the best teachers emphasized that their ability to control temperature in classrooms is very important to student performance.[35]

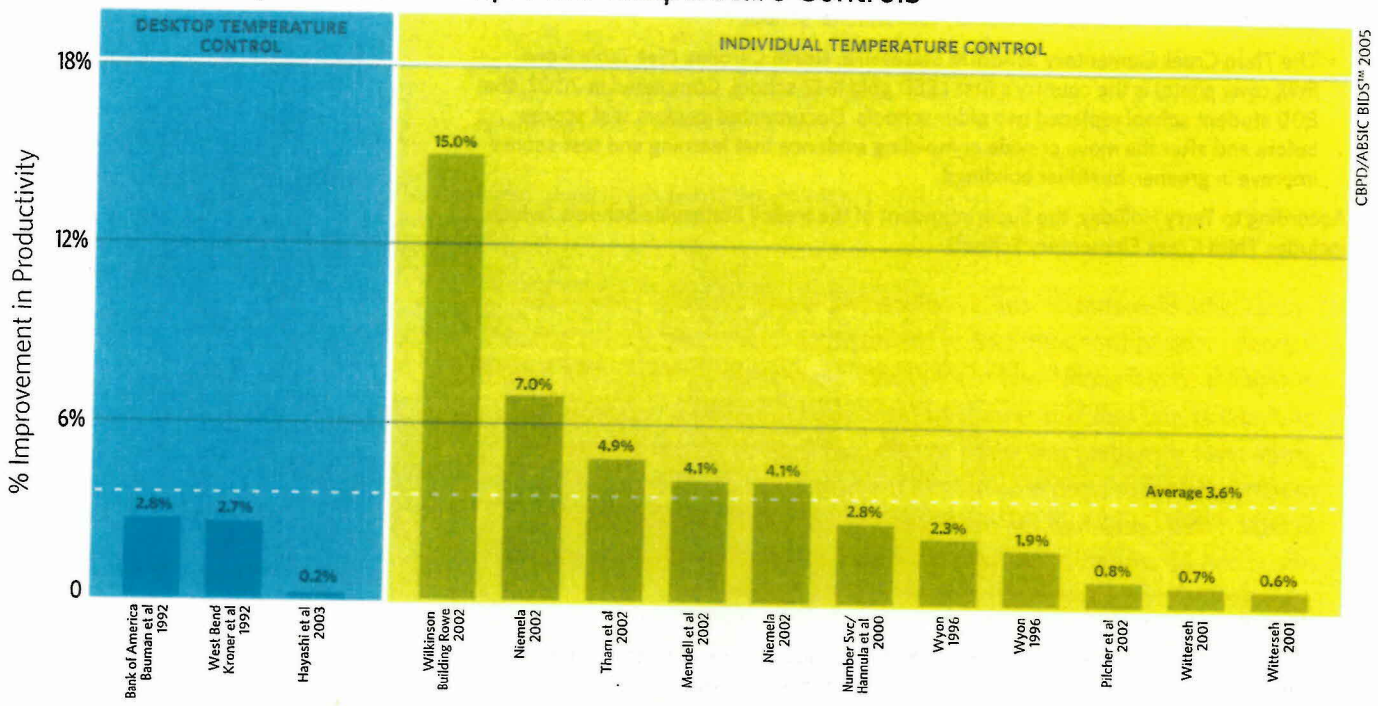
A review of 14 studies by Carnegie Mellon on the impact of improved temperature control on productivity found a positive correlation for all studies, with productivity improvements ranging from 0.2% up to 15%, and with an average (mean) of 3.6% *(Figure C)*.

HIGH PERFORMANCE LIGHTING

Green school design typically emphasizes providing views and managing daylight - specifically increasing daylight while eliminating glare. These two design features have both been correlated with improvements in performance on tests of office workers. In a study of 200 utility workers, workers with the best views performed 10% -25% better on tests. Workers in offices without glare outperformed workers in offices with glare by 15% or more.[36] The consensus findings in a review of 17 studies from the mid 1930s to 1997 found that good lighting "improves test scores, reduces off-task behavior, and plays a significant role in the achievement of students."[37] Another synthesis of 53 generally more recent studies also found that more daylighting fosters higher student achievement.[38]

FIGURE C

Productivity Gains From Improved Temperature Controls



SOURCE:
Carnegie Mellon University Center for Building Performance, 2005

Carnegie Mellon summarized findings from 11 studies documenting the impact of high performance lighting fixtures on productivity. Their analysis found that productivity gains ranged between 0.7% and 26.1% with an average (median) of 3.2%. *(Figure D).*

The high performance lighting attributes include efficient lighting and use of indirect lighting fixtures, features that are normal in high performance green buildings.

IMPROVED LEARNING AND TEST SCORES

In fall 2005 Turner Construction released a survey of 665 executives at organizations involved in the building sector. Of those involved with green schools, over 70% reported that green schools reduced student absenteeism and improved student performance.[39] *(Figure E).*

A large number of school specific studies indicate a significant positive impact. For example:

- An analysis of two school districts in Illinois found that student attendance rose by 5% after incorporating cost-effective indoor air quality improvements.[40]
- A study of Chicago and Washington, DC schools found that better school facilities can add 3 to 4 percentage points to a school's standardized test scores, even after controlling for demographic factors.[41]
- A recent study of the cost and benefits of green schools for Washington State estimated a 15% reduction in absenteeism and a 5% increase in student test scores.[42]

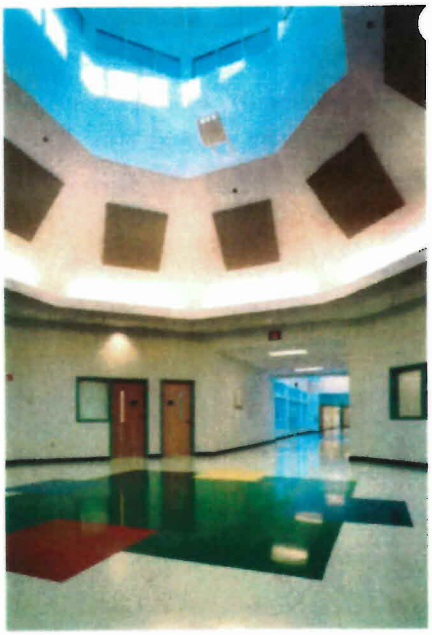
Three of the green schools analyzed for this report demonstrate similar significant improvements in performance:

- Students moving into the Ash Creek Intermediate School in Oregon (See Table B) experienced a 15% reduction in absenteeism.[43]
- Students moving from a conventional school to the new green Clearview Elementary School, a 2002 LEED Gold building in Pennsylvania (See Table B and photo on page 14), experienced substantial improvements in health and test scores. A PhD thesis on the school found a 19% increase in average Student Oral Reading Fluency Scores (DIBELS) when compared to the prior, conventional school.[44]
- The Third Creek Elementary School in Statesville, North Carolina *(See Table B and front cover photo)* is the country's first LEED gold K-12 school. Completed in 2002, the 800 student school replaced two older schools. Documented student test scores before and after the move provide compelling evidence that learning and test scores improve in greener, healthier buildings.

According to Terry Holliday, the Superintendent of the Iredell Statesville Schools (which includes Third Creek Elementary School),

> *"Third Creek Elementary School replaced ADR and Wayside Elementary Schools, schools that were two of the district's lowest performing school in regards to test scores and teacher retention/absence. This same group of students and teachers improved from less than 60% of students on grade level in reading and math to 80% of students on grade level in reading and math since moving into the new Third Creek Elementary School. Third Creek had the most gains in academic performance of any of the 32 schools in the school system. We feel that the sustainable approach to this project has had very positive results."*[45]

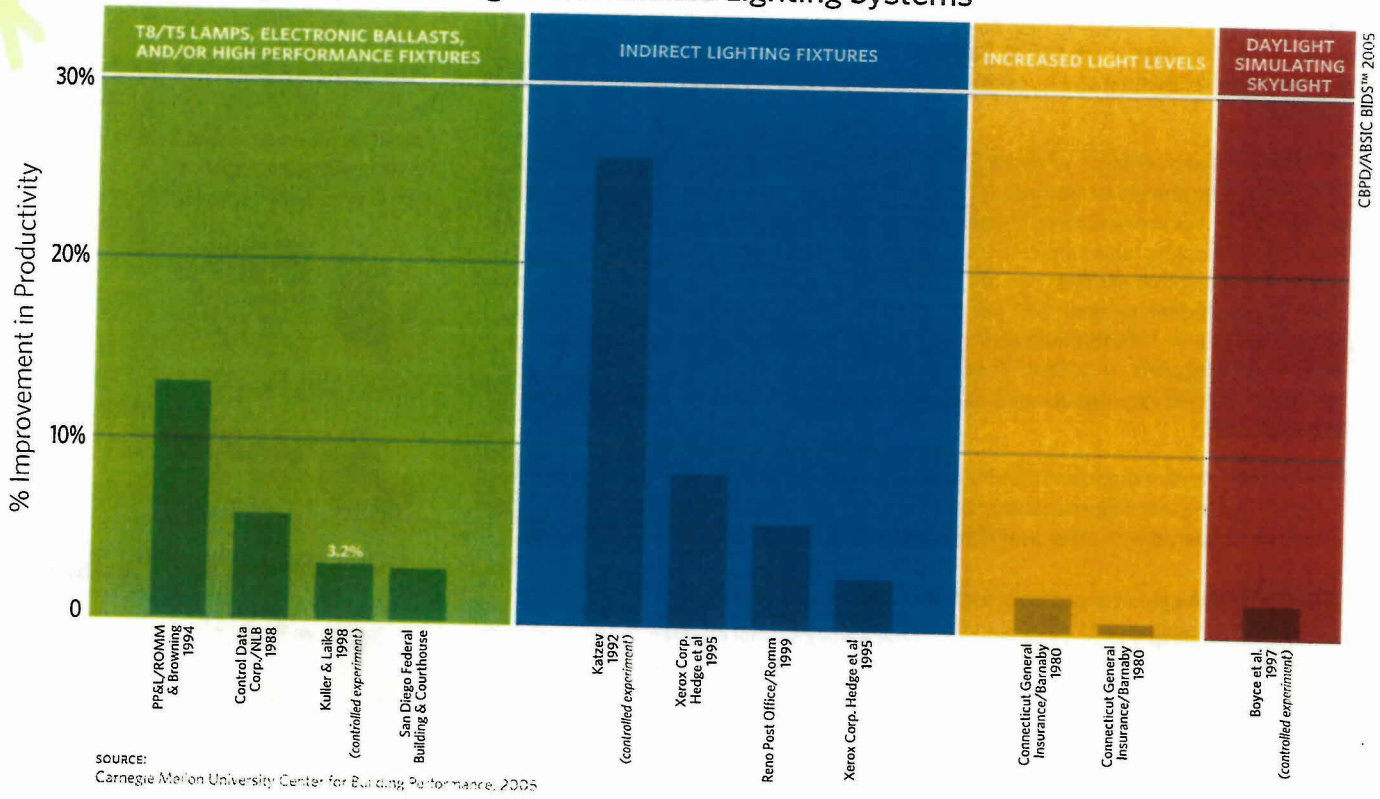
CHPS, LEED and other green school certifications include a range of material, design and operation measures that directly improve human health and productivity. In addition to achieving the related air and comfort quality prerequisites, the 30 green schools



Third Creek Elementary School
Moseley Architects
Photo: Spark Productions

FIGURE D

Productivity Gains from High Performance Lighting Systems



SOURCE:
Carnegie Mellon University Center for Building Performance, 2005

reviewed achieved about half the available indoor environmental quality points from features specifically designed to improve lighting, air quality and comfort.

Based on actual improvements in design in green schools and based on a very substantial data set (some of which is addressed above) on productivity and test performance of healthier, more comfortable study and learning environments, a 3-5% improvement in learning ability and test scores in green schools appears reasonable and conservative. It makes sense that a school specifically designed to be healthy, and characterized by more daylighting, less toxic materials, improved ventilation and acoustics, better light quality and improved air quality would provide a better study and learning environment.

Greening school design is extraordinarily cost-effective compared with other available measures to enhance student performance.

Financial Impact of Improved Health and Learning in Green Schools

FUTURE EARNINGS

Faster learning and higher test scores are significantly and positively associated with higher lifetime earnings.[46] A 2005 review of the financial benefits of education in an International Monetary Fund (IMF) publication concludes:

[Recent] studies, which are based on different, nationally representative data sets that follow students after they leave the education system and enter the labor force, provide remarkably similar estimates: one standard deviation increase (moving from the average of the distribution to the 84th percentile) in mathematics performance at the end of high school translates into 12 percent higher annual earnings — an earnings gain that can be expected across the entire working life of the individual. And there are reasons to believe that these estimates provide a lower bound on the effect of higher educational achievement.[47]

An increase in test scores from 50% to 84% is associated with a 12% increase in annual earnings. As discussed earlier, a smaller improvement in test scores can be conservatively expected from high performance schools compared with conventional schools – in the range of 3% to 5%. Based on the IMF analysis cited above, a 3-5% improvement in learning and test scores is equivalent to a 1.4% lifetime annual earnings increase.

With average annual salary of about $38,000 per year, this improvement in learning and test scores implies an earnings increase of $532 per year for each graduate from a green school. We are assuming, conservatively, that the earnings benefits last only 20 years, even though studies indicate they last for the employment lifetime of about 40 years. Assuming that earnings rise only at the rate of inflation, the present value is about $6,800 per student, or about $49 per ft^2. (At a marginal combined federal state and local taxes rate of 40% this indicates an NPV over 20 years of additional tax revenue of $2,700 per student, or $20/ft^2. If one-third of students move to other states, state-specific employee earnings benefits decline to an estimated 20 year financial benefit of about $33/ft^2.)

Increases in earning represent the single largest financial benefit from building healthier, more productive learning environments. Greening school design is extraordinarily cost-effective compared with other available measures to enhance student performance.

FINANCIAL BENEFITS OF ASTHMA REDUCTION

Asthma is a widespread and worsening disease among school children.[48] The American Lung Association has found that American school children miss more than 14 million school days a year because of asthma exacerbated by poor indoor air quality.[49] Nationally, about one in ten of all school children suffer from asthma.

An American Lung Association 2005 Fact Sheet on Asthma and Children notes that:

- Asthma is the most common chronic disorder in childhood, currently affecting an estimated 6.2 million children under 18 years; of which 4 million suffered from an asthma attack or episode in 2003.[50]
- Asthma is the third leading cause of hospitalization among children under the age of 15, and it disproportionately affects children.
- The annual direct health care cost of asthma is approximately $11.5 billion, with additional indirect costs (e.g. lost productivity) of another $4.6 billion.[51]

It costs nearly three times more to provide health care for a child with asthma than a child without asthma.[52] In 2006 dollars this amount is equal to $1,650 per child.[53] Note that most of these health costs are not borne by the schools but rather by the students and their families.

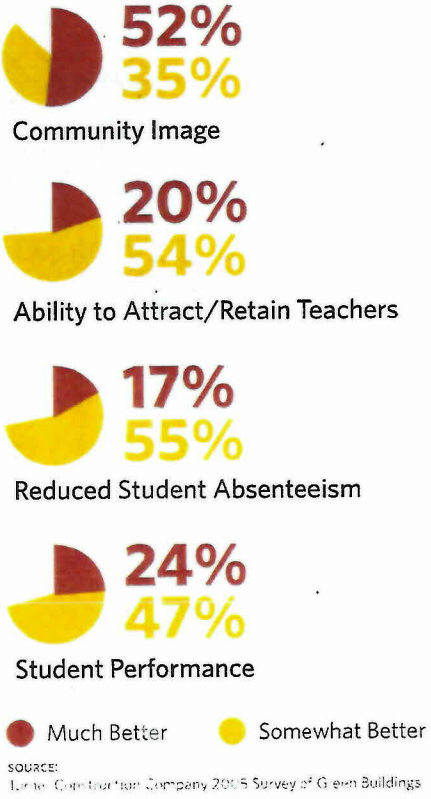
A recent review by Carnegie Mellon of five separate studies evaluating the impact of improved indoor air quality on asthma found an average reduction of 38.5% in asthma in buildings with improved air quality.[54]

We assume the impact of a shift from an unhealthy, conventional school to a healthy school results in a reduction in asthma incidence of 25%. In an average sized new school of 900 students, a 25% reduction in asthma incidence in a healthy school translates into 20 fewer children a year with asthma, with an associated annual cost savings of $33,000.[55] Over 20 years, and assuming costs of medical treatment continue to rise at the recent historical rate of 5% per year,[56] at a 7% discount rate this translates into a benefit of over $3/ft^2. A small portion of this benefit would accrue directly to the school in the form of reduced need for nurse care and staff time, while the rest would benefit families and the larger community through reduced health-care needs. This calculation underestimates the asthma reduction benefits since it does not reflect health improvements in school faculty and staff, which are only partially captured in the analysis on faculty retention impact below.

FIGURE E

Benefits of Green K-12 Facilities

Executive Views on Green School Performance Compared with Conventional Schools



SOURCE:
Turner Construction Company 2005 Survey of Green Buildings

A recent review of five separate studies found an average asthma reduction of 38.5% in buildings with improved air-quality.

ACTION

Enck
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cc: LaPosta
Action
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12/9/2010
below

OFFICE OF THE MAYOR
THE CITY OF NEW YORK

DENNIS WALCOTT
DEPUTY MAYOR FOR EDUCATION
AND COMMUNITY DEVELOPEMNT

November 19, 2010

Judith Enck
Regional Administrator
U.S. Environmental Protection Agency
290 Broadway
New York, N.Y. 10007-1866

Dear Ms. Enck,

Thank you for meeting with me and other City officials on Monday, November 1st to discuss the ongoing pilot program for testing and remediation of polychlorinated biphenyls (PCBs) in five school buildings. We agreed to meet to discuss our mutual concern that the lighting ballasts in older fluorescent lighting fixtures may contribute to PCBs in air. We also discussed EPA's request that New York City initiate a new program to replace all PCB ballasts in what we estimate is between 750 and 850 buildings operated by the New York City Department of Education prior to the completion of the pilot program (We will be forwarding the results of survey we did of City school buildings to your staff shortly). While I appreciate your agency's continued technical guidance and oversight on these issues, I must respectfully reiterate the City's position that the most prudent course of action is for the City and EPA to complete the pilot program, including Stage 2, which specifically sets forth a detailed process for developing a Citywide PCB Management Plan.

As you know, in 2009, EPA and the City carefully negotiated the detailed terms and conditions of the pilot study over an approximately six-month period. This lengthy negotiation yielded a clear, yet flexible, framework to investigate and address PCBs in caulk, as well as in other building components such as lighting ballasts. As proven by the work this past summer, the pilot study produced not only invaluable environmental data on PCB levels in air, dust, and building materials, but also essential information on, among other things, how to use and apply EPA's new air guidance levels in a real-world environment; how long these projects will take; how much these projects cost; and how to conduct effective public outreach and coordination in school communities.

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Printed on paper containing 30% post-consumer material.

This type of information – which will increase as the City begins work at the two remaining pilot schools – will guide the discussions required by Stage 2 of the Pilot. Stage 2 of the Pilot begins with the City submitting a recommended Preferred Remedy to EPA. EPA then must convene an independent peer review panel to evaluate the effectiveness of the recommended Preferred Citywide Remedy and make recommendations to EPA. EPA must also convene a public meeting to receive comments on the Preferred Citywide Remedy. After this peer and public review process, EPA and the City must commence a mandatory sixty-day negotiation on the Preferred Citywide Remedy. Given that a framework for developing a thorough, safe, and peer-reviewed Citywide PCB Management Plan already exists, the City believes it would be counterproductive, at this time, to create additional programs based on the initial findings of the pilot study.

First and foremost, both EPA and the City Department of Health and Mental Hygiene (DOHMH) agree that there is no immediate health risk to students and staff occupying schools buildings that have PCB containing building materials. The primary means of human exposure to PCBs remains food, and PCB levels in people have been declining since the use of PCBs was banned in 1978 despite its presence in building materials. The City does not believe it would be prudent or consistent with existing scientific evidence to abandon or modify significantly the well-crafted pilot study process.

Second, Region 2's request that the City undertake an extensive "revamping" of all public school buildings in addition to the ongoing pilot study, is disproportionate to its current national and regional policies on this issue, especially given the actions already undertaken by the City. The City is leading the country in addressing the issue of PCBs in building materials. It is the only municipality to enter into a pilot agreement with EPA to evaluate ways that PCBs can be managed in a classroom environment. We are not aware of any other similar action that EPA is taking nationally or within Region 2. If EPA has yet to develop a national policy on this issue, the City should not be required to undertake extensive additional measures at this juncture.

We do appreciate your suggestion of issuing RFPs through energy service companies (ESCOs). The City's Department of Citywide Administrative Services (DCAS) is already familiar with the ESCO approach and is exploring this and other ways to supplement the City's efforts to make all City owned buildings energy efficient and achieve our climate action goals. However, it is uncertain to what extent the City can use this approach to further supplement the City's existing efforts to undertake these projects to reduce the City's carbon footprint; especially when one considers our $1 billion estimate to replace all the older fluorescent lighting fixtures in City school buildings. DCAS Deputy Commissioner Ariella Maron, who has previously met with your staff, is available to discuss the potential use of ESCOs in much greater detail so that EPA has a firm understanding of the City's existing efforts to do lighting replacement projects generally and the role, if any, ESCOs might have.

I want to take this opportunity to thank EPA for working so well with the City on the pilot program. We also have agreed to create a working group to discuss these issues further to enhance our collaborative efforts. Please let me know how often you would like this group to meet and who your representatives will be.

Sincerely,

Dennis M. Walcott

Cc: Thomas Farley
Kathleen Grimm
Ross Holden
Susan Kath
Jeffrey Shear

EPA REGION 2
CORRESPONDENCE
CONTROL OFFICE
2010 NOV 24 AM 11:31

CITY OF NEW YORK

PILOT STUDY TO ADDRESS PCB CAULK IN NEW YORK CITY SCHOOL BUILDINGS

Presentation to

Community Education Council 31 (CEC 31)
Public Calendar Meeting

I.S. 024 Myra S. Barnes
225 Cleveland Avenue, Staten Island, NY 10308

November 1, 2010 at 7:30 pm

SCA
School Construction Authority

TRC

NYC
Department of Education
Joel I. Klein, Chancellor

Pilot Study Background

- Beginning in 1950, caulk containing PCBs was used legally in constructing and renovating many buildings in the U.S.
- PCBs subsequently were found to pose potential health concerns and their use was banned in 1978
- PCB caulk may exist in some NYC schools and other buildings constructed between 1950 to 1978

Pilot Study Background

- The City of New York and SCA reached agreement with the US Environmental Protection Agency (EPA) to conduct a pilot study of five New York City school buildings, to:
  - Measure the amount of PCBs in air, dust and soil
  - Determine the most effective ways to reduce potential exposures to PCBs contained in caulk
- Consent Agreement and Final Order (CAFO) , Docket No. TSCA—02-2010-9201, dated January 19, 2010
  - The ultimate goal of the Pilot Study is to develop a citywide approach to assessing and managing PCB Caulk in schools built between1950 and 1978

EPA Guidance Levels for PCBs

Substance	PCB Concentration
Manufactured Materials (such as caulk, oil)	50 parts per million
Air in Elementary Schools	300 nanograms/cubic meter*
Air in Pre-Kindergarten/Kindergarten	100 nanograms/cubic meter*
Dust	10 micrograms/100 square centimeters
Soil	1 part per million

- * These are very low levels; a nanogram is one billionth of a gram.
- EPA guidance levels for air are intended to be protective of long term exposure with adequate margin of safety.
- Short term exposures above the guidance level for air are unlikely to result in adverse health effect.

Health Concerns

- No immediate health concerns for building occupants
- No evidence of health effects related to PCB exposures from building materials
- PCBs are widespread in the environment and most people have some PCBs in their bodies
- Since 1970's PCBs in the environment and humans have decreased
- Known human health effects related to high exposures in workplace and contaminated food.
- Reducing exposure is priority

Pilot Study Background

- The Pilot Study defines three exposure areas for study:
  - Primary Exposure Areas - Classrooms, gymnasiums, and cafeterias.
  - Transitory Areas – Interior areas such as stairways, hallways and bathrooms.
  - Outside Exposure Areas – Areas within a ten foot wide strip of any exposed soil immediately adjacent to school buildings.
- SCA and the NYC Department of Education (DOE) implemented the pilot study this past summer at:
  - **PS 309K/Excellence Charter**
  - **PS 199M**
  - **PS 178X/P176@178X**

Pilot Study Remedial Activities in Representative Areas

School	Remedial Remedy
P.S. 309K/Excellence Charter	Encapsulation of PCB Caulk
P.S. 199M	Remove and Replace PCB Caulk
PS178X/176	Patch and Repair PCB Caulk

Pre- and Post-Remedial PCB Testing

- SCA conducted pre-remedial inspections and baseline sampling of PCBs in air, dust and soil at the three buildings
- Post-remedial PCB air and dust wipe samples were obtained from the same locations as pre-remedial sampling to evaluate remedial alternatives.

Air Sampling Results Summary

- A representative number of classrooms and other school areas, such as gyms, cafeterias and hallways, were tested in each school
- Results from the following rounds of air samples are posted on the Pilot Study website at

  http://schools.nyc.gov/Offices/SCA/Reports/EPA

  - Baseline Pre-Remediation Air sample Results
  - Post-Remedial Air sampling Results
  - Post-Ventilation Air Sample Results
  - Post-Light Fixture Replacement Air Sample Results
  - Post- Supplemental Cleaning, HVAC Repair and Encapsulation Air Sample Results

Air Sampling Results Summary

- In all cases, conditions in the schools have improved since remediation has been completed, schools ventilated, and old fluorescent lighting fixtures removed
- Some areas exceed guidance levels in PS 199M and the SCA will continue to take further actions to reduce these levels

Dust Sampling Results Summary

- SCA obtained 74 baseline pre-remediation composite dust wipe samples in the three Pilot Schools, all of which were below EPA guidance levels
- Following remediation activities, composite dust samples were collected in the same 74 locations; all samples were below EPA guidance levels, except one sample in the gymnasium of PS 199M was elevated
  - Re-sampling of the anomalous PS 199M gymnasium results showed that all samples for that location were all below the EPA guidance levels
- More details on soil sampling results are provided at **http://schools.nyc.gov/Offices/SCA/Reports/EPA**

Soil Sampling Results Summary

- Results of the soil tests at the three Pilot Schools indicated that PCBs were detected above EPA guidance values in specific areas with soil.
- SCA is developing remedial work plans to remove impacted soils that will be implemented upon approval by the appropriate regulatory authorities
  - Pending remediation, the SCA has isolated these areas with a geo-textile fabric and cover material as approved by EPA
- More details on soil sampling results are provided at **http://schools.nyc.gov/Offices/SCA/Reports/EPA**

Best Management Practices

- Best Management Practices will include:
  - Routine inspection of caulk and remediation as necessary, e.g. remove and replace, patch and repair, encapsulation
  - Appropriate maintenance
  - Cleaning procedures
  - Maintenance and cleaning of ventilation systems
  - Ensuring optimal air circulation and ventilation through inspections of existing building systems, and prioritizing repairs of these systems when necessary

Best Management Practices (cont'd)

- Best Management Practices will include:
  - Proper disposal of PCB caulk when disturbed during building renovations
  - Communication to school community and training of custodial staff

Schedule of Pilot Study Implementation

- Data Analysis, Remedy Evaluation, and Reporting: **Oct - Dec 2010**
- Interim Report Preparation: **Nov 2010 - Jan 2011**
- Submit Interim RI/FS Reports to EPA: **January 2011**
- Perform Pre-Remedial Investigation/Sampling in Pilot School Buildings 3R and 183Q: **April 2011**
- Implement Pilot Preferred Remedies in Pilot School Buildings 199M, 178X/176 and 309K: **June - August 2011**
- Implement Remedial Investigation in Pilot School Buildings 3R and 183Q: **June - August 2011**

Schedule of Pilot Study Implementation (cont'd)

- Implement Post-Remedial Sampling: **August 2011**
- Sample Analysis and Data Return: **June - August 2011**
- QA Data Validation: **Sept - October 2011**
- Data Analysis, Remedy Evaluation, and Reporting: **Oct - Dec 2011**
- Report Preparation: **Nov 2011 – Jan 2012**
- Submit Final RI /FS Reports with Summary Report on School-Wide Remediation: **January 2012**

Pilot Study Contacts

- Primary Points of Contact on Pilot Study Activities are:
  - **Vinicius Castagnola**, Vice President
    Environmental and Regulatory Compliance
    NYCSCA - 30-30 Thomson Avenue, Long Island City, NY 11101
    Phone: 718-472-8050; Email: vcastagnola@nycsca.org
  - **Elias Rodriguez**, M.P.A., Press Officer
    U.S. Environmental Protection Agency
    290 Broadway, New York, NY 10007
    Phone: 212-637-3664; Email: rodriguez.elias@epa.gov

Visit the Pilot Study website at
http://schools.nyc.gov/Offices/SCA/Reports/EPA
to learn more and to join the Listserv

NYLPI

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TTY 212-244-3692 www.nylpi.org

August 21, 2015

Judith Enck
Administrator, Region 2
U.S. Environmental Protection Agency
290 Broadway
New York, NY

Dear Ms. Enck:

We write, as key stakeholders in the New York City public school system representing parents and workers in the schools, to request a meeting with the E.P.A. regarding the current proposed plan to address PCB-contaminated caulk in the New York City public schools. We have reviewed the City's May 2015 revisions to its Preferred Citywide Remedy and have a number of significant concerns. We believe the revised remedy fails to incorporate the components E.P.A. recommended, and fails to meaningfully protect the health of students and school personnel. We have also reviewed the E.P.A.'s July 28, 2015 guidance on PCBs in Building Materials and have several questions about how it will influence the City's remedy.

We strongly urge E.P.A. not to approve the City's revised plan until we have met to discuss our concerns, which are summarized in the attached memo. The primary problem with the City's preferred remedy is that it lacks any systematic assessments – both of where PCB exposures may endanger health in the first place, and of whether measures taken to mitigate exposure, such as ventilation, are effective in reducing PCB air concentrations to acceptable levels. Given that PCBs in schools continue to present a pervasive risk of toxic exposure for children and workers throughout the city, it is crucial to develop a plan that reassures the public and includes responsible measures to protect public health.

We look forward to meeting with you in the near future to further discuss these issues. You may contact Rachel Spector at (212) 244-4664 or rspector@nylpi.org for scheduling.

Sincerely,

Rachel Spector
Senior Staff Attorney, New York Lawyers for the Public Interest

New York Committee for Occupational Safety and Health
New York Communities for Change
SEIU Local 32BJ

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cc: John Gorman, Chief, Pesticides and Toxic Substances Branch
James Haklar, Senior PCB Disposal Specialist, Division of Compliance and Enforcement Assistance

NYLPI

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August 21, 2015

Memorandum to E.P.A. Region 2 on Problems with New York City's Preferred Citywide Remedy for PCB Caulk in Public Schools

New York Lawyers for the Public Interest, New York Communities for Change, SEIU 32BJ, and New York Committee for Occupational Safety and Health

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The final long-term remedy for caulk in New York City public schools will have serious implications for students and staff for many years to come. While we understand the complexities of addressing PCB contamination stemming from caulk, particularly in as large a system of buildings as the New York City schools, the City's current proposal for a Citywide Remedy would expose students and personnel to unacceptable levels of health risk.

Like E.P.A., we support a risk-based approach to addressing PCB-contaminated caulk, which is suspected to be present in over 700 New York City public schools. However, the May 2015 revised Citywide Preferred Remedy still fails to adequately assess risk in the great majority of schools where PCBs are known or suspected to be present. The primary problem with the City's preferred remedy is that it lacks any systematic assessments – both of where PCB exposures may endanger health in the first place, and of whether measures taken to mitigate exposure, such as ventilation, are effective in reducing PCB air concentrations to acceptable levels. Any citywide remedy must take a systematic approach to understanding what and where the risks from PCB-contaminated caulk are. Ideally, the City's investigation should include identification, inventory, and bulk sampling of suspect caulk. At the very least, air sampling must take place on a more comprehensive scale that what is currently proposed. The remedy also needs to adopt an evidence-based approach to mitigating airborne exposures by measuring the extent of ventilation necessary to keep PCB concentrations in the air below E.P.A. "Exposure Levels," as recently set forth in the July 28, 2015 guidance document.

The five-school Pilot Study produced some important information about PCB exposures and the effectiveness of remedial measures – perhaps most importantly, leading to removal of PCB-containing light ballasts throughout the school system. As expressed in our 2014 comments, however, the study was insufficient in several respects. The fact that later rounds of testing were conducted only with the windows open makes reliance upon the results difficult. Moreover, the study does not support the City's assertion in its revised Preferred Remedy that removing PCB light ballasts alone, combined with implementation of Best Management Practices (BMPs), will ensure that PCB air concentrations are below EPA Exposure Levels in all schools. That combination of remedial measures was only taken in one school, PS 3R, and the Summary Report states that there was no statistically significant difference in PCB air concentrations at that school after the remedial measures. Moreover, four of the five schools took additional remedial measures not contemplated in the Preferred Remedy. The outcomes are not necessarily applicable to current conditions in most schools. In PS 199M, PCB concentrations

remained high despite numerous measures; PS 178X had a central HVAC system that effectively reduced PCB concentrations, which most schools lack. Finally, given the number and variety of conditions in schools in the New York City school system that are potentially contaminated with PCB caulk, five schools is simply an insufficient sample size to fully understand the risks and determine an appropriate remedy.

The City's Preferred Citywide Remedy makes numerous assumptions about whether PCBs are present in any given school, about the existence of exposure risks, and about the effectiveness of remedial measures such as ventilation. To be effective, a long-term remedy must be based on more robust evidence, and should at the very least investigate the following questions:

- After PCB light ballasts have been removed, are PCB air concentrations consistently below E.P.A. health guidelines across the school system?
- To what extent are current ventilation systems effective in mitigating PCB exposures? What level of air exchanges are necessary to bring PCB concentrations within E.P.A. health guidelines, and under what conditions? Is appropriate mechanical ventilation available in all affected indoor spaces?
- What are the risks of exposure from visibly deteriorating caulk in comparison to caulk that is not visibly deteriorating? We note that the E.P.A.'s recent guidance document states that PCBs may be released from intact or deteriorating caulk, but the City's BMPs continue to focus only on deteriorating caulk.

In its January 2015 letter, E.P.A. urged the City to address these questions by including components in its remedy such as air sampling in a broader range of schools, prioritized by various factors, taking measures to remediate where sampling found high PCB air concentrations, and optimizing ventilation. The City's response is to test the air in only two additional schools, based upon highly questionable criteria, and to address poorly functioning ventilation systems in only ten schools. This extremely limited investigation cannot be called a citywide remedy, given suspected contamination in over 700 schools.

The City's proposed criteria for prioritizing schools for investigation – based primarily on whether the school was built with the same general contractor as PS 199M – seem designed to artificially narrow the list of schools for investigation and lacks a clear scientific basis. Other grounds for prioritization make far more sense, such as whether high concentrations of PCBs have been found in interior caulk at the school in the past, the age of students, and the quality of a school's ventilation systems. E.P.A.'s recent guidance document is not entirely clear on what factors are most useful in deciding where air testing should be done, and why those factors are relevant. While we understand buildings are different, developing an effective investigation plan for NYC requires clarity on this issue.

In addition, we know that the majority of school classrooms are not served by a central HVAC system. While we believe properly functioning central HVAC systems could be very effective in mitigating PCB exposure, we need better data on how well the unit exhaust systems

present in most classrooms work under various types of conditions. Given the poor quality of ventilation systems throughout the school system, the City's proposal to address HVAC deficiencies in just ten schools is not an effective measure to reduce PCB exposure.

Finally, the City relies heavily on its Best Management Practices to mitigate PCB exposures. While we believe the cleaning protocols are effective at protecting students from coming into contact with PCB-contaminated dust or soil tracked into the schools, there are some serious gaps in the BMPs as well. First, they place school staff such as custodians, who are most likely to come into direct contact with PCB caulk, at the front lines without giving them knowledge of where the PCBs are actually located. By simply assuming without testing that all caulk contains PCBs, the proposed remedy leaves front-line staff in the dark about where they are most likely to be exposed to the chemicals. Anecdotal reports indicate that custodial staff receive inadequate training, or no training, on the identification, hazards, and safe handling of PCB caulk. In addition, the BMPs assume that deteriorated caulk is an exposure threat and that non-deteriorated caulk is not. However, we are unaware of scientific evidence to support this assumption. By focusing all attention on deteriorated caulk, the City may be ignoring caulk that is a source of exposure.

Gavin: 700 bldgs. have caulk. Only tested 5.
No comment to evaluate when the risks are + what the remedy is.

— Look at schools where there were catastrophic failure. Can we get sample there?

— encapsulation → holds us 2 few years —

asbestos. plans to proactively identify it. assessment. maintain it in place. HERA for guidance. HERA.

Need a fair assessment.

janitors: what do they wear?

EPA issued 50 or 60 cleaning protocols for the schools.

Daniel Drum. Ed. chair
steel local 3

Statement of
U.S. Environmental Protection Agency, Region 2
Submitted to the Council of the City of New York
Committee on Environmental Protection and Committee on Education
for the April 13, 2011 Hearing on
The New York City Department of Education's Comprehensive Plan to Increase Energy Efficiency and Environmental Quality at Schools, Including the Removal of PCBs

Thank you for the opportunity to comment on the issue of PCBs in lighting ballasts in New York City's public schools. This is a topic that has gained increasing public attention in recent months, and we would like to take this opportunity to explain EPA's involvement in the matter, and express our concerns. We feel that the length of time the City has allotted to remove and replace all PCB-containing lighting ballasts is too long. We recommend that the lighting replacements be completed in no more than five years.

In January 2010, EPA announced an agreement with New York City to conduct a pilot study in five public schools. The initial goal of the study was to better understand the problem caused by PCBs in caulk, and to evaluate strategies for reducing potential exposure to PCBs throughout the entire school system. During the summer of 2010, the New York City School Construction Authority took extensive air, dust and soil samples in and around three of the five pilot schools. Test results found PCBs levels in the air above established health-based benchmarks in areas of each of the three schools. They also found PCBs in the soil around the schools.

In these three pilot schools, New York City began work to find and remediate the sources of PCB contamination. It was determined that widespread leaking PCB-containing lighting ballasts were contributing to the elevated levels of PCBs in the air. These older, PCB-containing lighting ballasts had been in use over an extended period and eventually failed, causing the PCB-containing material inside the ballasts to leak out and subsequently contribute to the elevated levels of PCBs in the air that children and school staff breathe.

PCBs have been demonstrated to cause a wide variety of adverse health effects. PCBs cause cancer in animals, as well as a number of serious non-cancer effects on the immune, reproductive, nervous and endocrine systems. EPA has determined that PCBs are a probable human carcinogen. Congress banned the manufacture of PCBs in the United States in 1977 because of their toxic effects. Congress also banned the use of PCBs, except in a totally enclosed manner or authorized by EPA. However, a large number of fluorescent light ballasts that were installed prior to the ban may contain PCBs and may still be in use in schools.

The typical life expectancy of these ballasts is ten to fifteen years. All of the pre-1979 ballasts in lighting fixtures that are still in use are now far beyond this life expectancy, increasing the risk of leaks, rupture or even fires, which pose health and environmental hazards. If a lighting ballast is leaking PCBs above the regulatory level of 50 parts per million (ppm), it is considered an exceedance. To be in compliance with federal law, the ballast must be immediately removed from use and disposed of, along with PCB-contaminated materials, at an EPA-approved disposal facility.

In an effort to inform school administrators and maintenance personnel, as well as the public about this issue, EPA released national guidance on December 29, 2010 recommending that schools remove older PCB-containing lighting ballasts.

Shortly after the release of the guidance, teachers at PS 36 in Staten Island became concerned about lighting fixtures that had leaked an oily substance onto the floor in two classrooms several years earlier, and informed their union representatives. EPA sent inspectors to the school, who conducted oversight as the City took samples in two locations where the ballasts had leaked onto the floor. Results showed PCB concentrations well above the EPA regulatory limit of 50 ppm.

In January and February 2011, EPA conducted seven targeted inspections at public schools in Manhattan, Brooklyn, Staten Island and the Bronx to evaluate lighting ballasts that may contain PCBs and determine if they were leaking or had leaked in the past. Overall, 145 samples were taken of material that appeared to have leaked from lighting ballasts. Out of this total, 113 samples showed results that are above the EPA regulatory limit of 50 ppm. At each school, at least two-thirds of the samples taken showed results above the regulatory limit. At PS 53 in Staten Island and at PS 45 and PS 306 in Brooklyn, one or more samples showed results above 100,000 ppm, which means that the material sampled was 10% PCBs. At PS 306 in Brooklyn, two samples showed a result of approximately 1,000,000 ppm, or 100% PCBs, and another was 95% PCBs.

Throughout the course of our inspections, EPA recommended that New York City develop a plan for assessing and addressing leaking ballasts in its schools city-wide. On February 23, 2011, the New York City Department of Education announced its "Comprehensive Plan to Increase Energy Efficiency and Environmental Quality at Schools." The Plan calls for the removal and replacement of all PCB lighting ballasts in 772 schools over the course of ten years. The Plan is also intended to result in complete energy audits and retrofits, which are expected to reduce the City's greenhouse gas emissions by more than 200,000 metric tons per year.

EPA recognizes this plan as a step in the right direction. However, we have been consistent in saying that ten years is too long for the removal of all PCB-containing lighting fixtures throughout the school system. EPA inspections indicate that there is a prevalence of leaking PCB ballasts in the City's school system. EPA believes that the lighting fixtures should be removed from these 772 schools in no longer than five years—and that the City can and should take steps to achieve this.

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